

WASTEWATER-BORN ALGAE FOR WASTEWATER TREATMENT

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BACKGROUND

Selecting the effective algal species for nutrients removal is paramount for microalgae-based wastewater treatment (Chen et al. 2021). When treating various types of wastewater, such as industrial, municipal, and agricultural wastewater, microalgae may show species-specific performance (Plöhn et al. 2021). Wastewater-born species may be a good source of choice when purifying the local wastewater, because the microalgae growing in the associated water bodies might be resilient to their complex environments, such as the high concentrations of nutrients, heavy metals (Cadmium, Mercury), oxygen and pesticides, etc (Maryjoseph and Ketheesan 2020).

OBJECTIVE

Select and enrich effective algal species/consortia from process water (PW) under lab conditions for nutrients removal from wastewater.

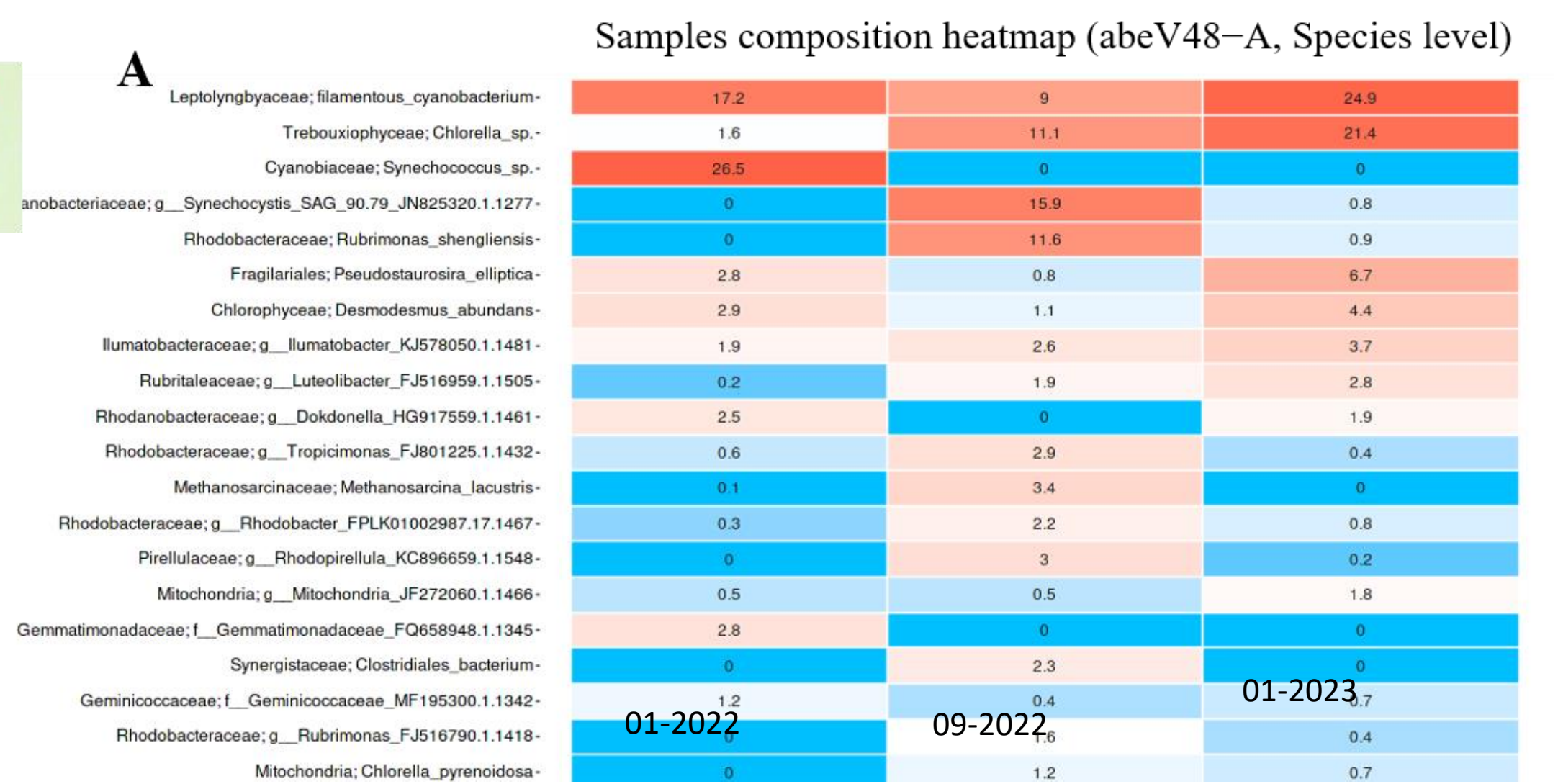
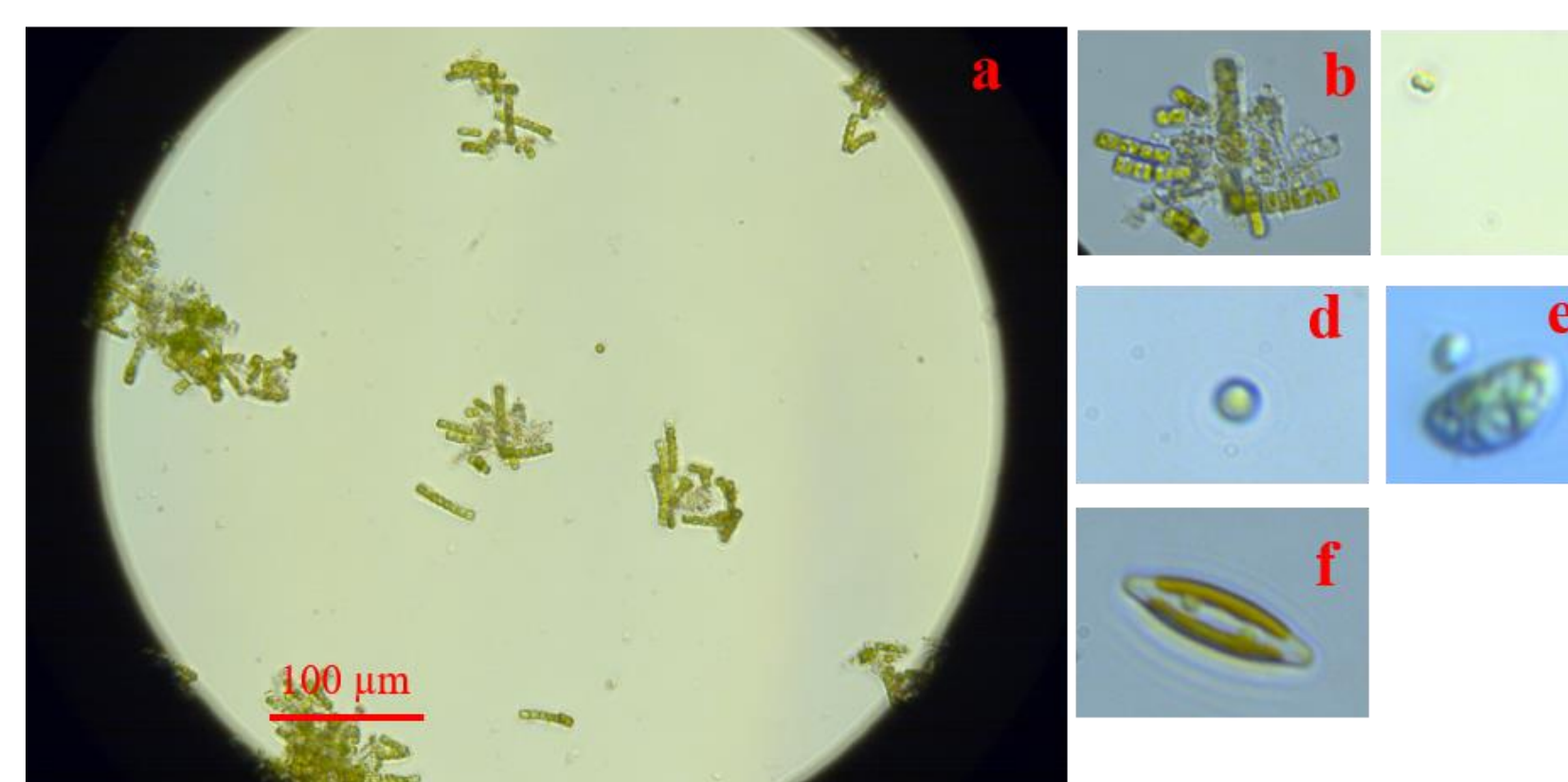
METHODOLOGY

1. Collection of mixed consortia from the open pond
2. Selection of algal strain using N-enriched medium under tailored lab conditions (lab-acclimation)
3. Verification of nutrients removal efficiency adopting the targeted strain

MICROBIALS ANALYSIS

Morphological identification using a light microscope

Molecular identification using gene amplicon sequencing.



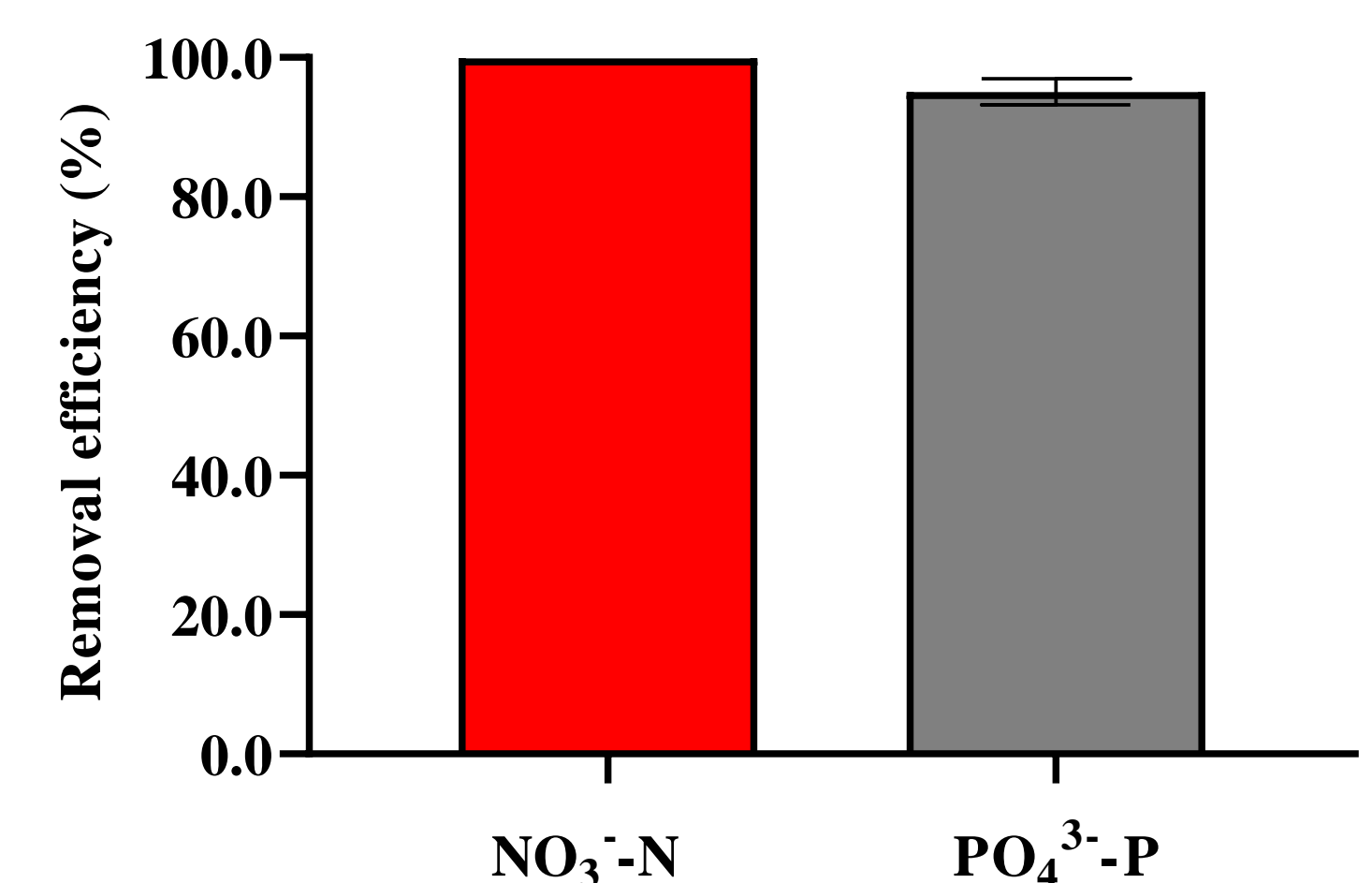
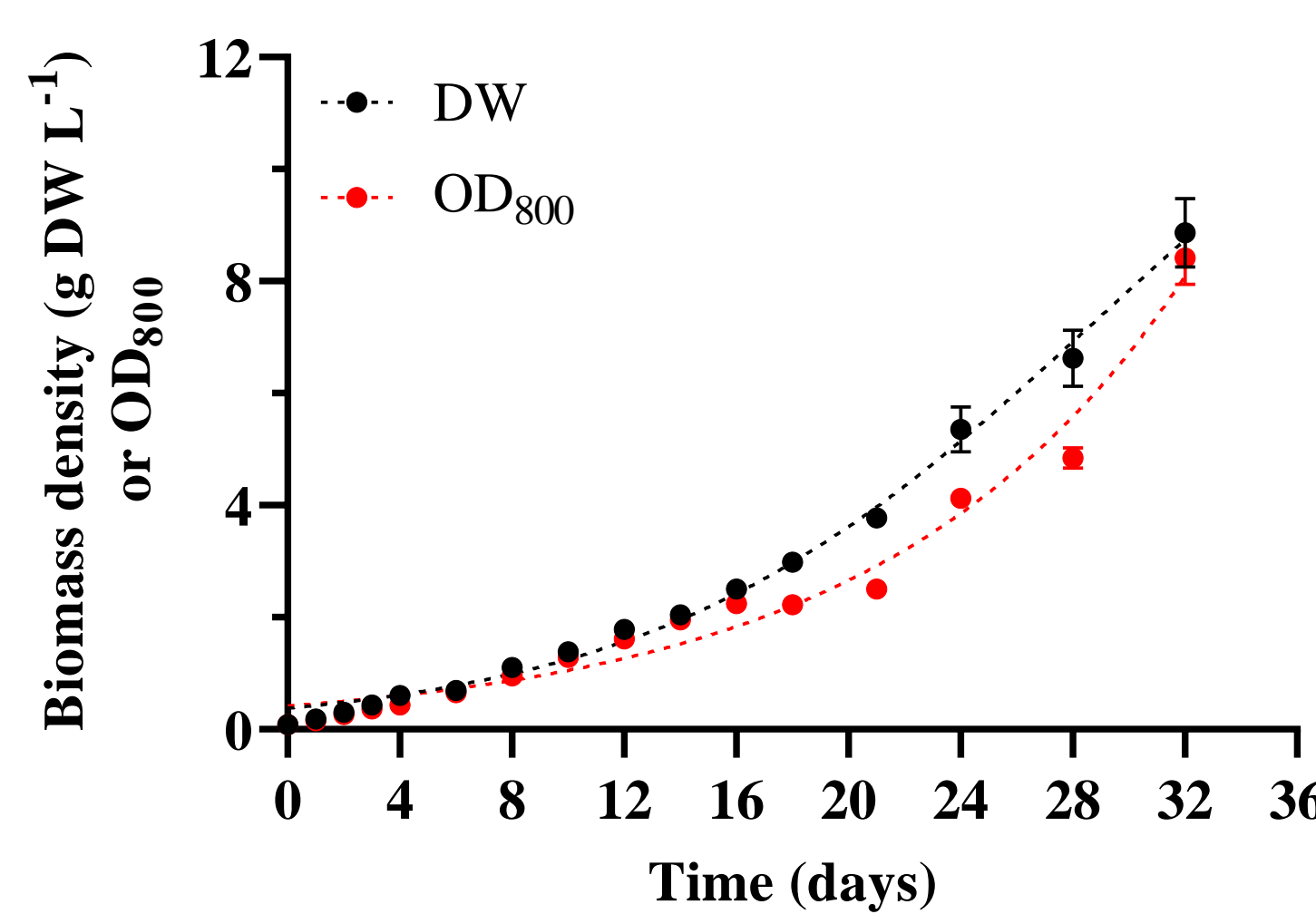
SELECTION & ENRICHMENT

N-enriched medium (Zarrouk's) :
 411.8 mg.L⁻¹ N-NO₃⁻ and 88.9 mg.L⁻¹ P-PO₄³⁻;
Lab conditions: 20 µmol photons.m⁻².s⁻¹, 25°C, 120 rpm
Algal strain targeted: *Picochlorum eukaryotum*

BIOMASS & NUTRIENTS REMOVAL

Maximal biomass density:
 8.87 g DW.L⁻¹, OD₈₀₀ = 8.42

Nutrients removal rate:
 N-NO₃⁻, 99.9%; P-PO₄³⁻, 95.1%.



CONCLUSIONS

1. Microbial composition in mixed cultures changed with seasons, with a prevalence of phototrophic microorganisms such as cyanobacteria, green microalgae, and diatoms;
2. After lab selection and enrichment, a wastewater-born alga, *Picochlorum eukaryotum*, was targeted and enriched for wastewater treatment;
3. *P. eukaryotum* showed high biomass yield and nutrients removal capacity.

